

C L A I M S

1. A method of manufacturing a tyre for vehicle wheels, said tyre (1) comprising a carcass structure having at least one carcass ply (2) operatively associated with a pair of annular reinforcing structures suitable for matching with a mounting rim, each annular reinforcing structure comprising at least one bead core (8) and one annular element (9), said at least one carcass ply (2) being turned up at least on one of said annular elements (9), said method comprising the steps of: feeding at least one semi-finished product onto a first-stage drum (20), placing at least one separating element (26) to a position radially external to said at least one semi-finished product, feeding said at least one carcass ply (2) onto said first-stage drum (20) at a radially external position with respect to said at least one separating element (26), placing said annular elements (9) to a position radially external to said carcass ply (2), turning up said carcass ply (2) around said annular elements (9), removing said at least one separating element (26), applying said bead cores (8), transferring said carcass structure to a second-stage drum, applying a belt structure (7) to said carcass structure at a radially external position, applying a tread band (6) to said belt structure (7) at a radially external position, shaping said tyre (1) into a toroidal conformation.
2. A method as claimed in claim 1, wherein two separating elements (26) are placed on said semi-finished product by an axial movement directed from the outside to the inside from opposite ends of said drum (20).

- 20 -

3. A method as claimed in claim 1, wherein radial superposition on said drum (20) between said first semi-finished product and said carcass ply (2) is consolidated at the contact points of same by a pressure device (21).

4. A method as claimed in claim 1, wherein said step of turning up said carcass ply (2) around said annular elements (9) contemplates an axial movement of said at least one separating element (26), to lift the flaps (10) of said carcass ply (2), causing each of said flaps (10) to be wrapped around the respective annular element (9).

5. A method as claimed in claim 4, wherein at the end of said axial movement of said at least one separating element (26), a step is provided during which each bead core (8) is placed to a radially external position with respect to each annular element (9) and to a position substantially adjacent and axially external to each of said flaps (10).

6. A method as claimed in claim 5, wherein the step of removing said at least one anti-adhesive element (26) is followed by a step of carrying said bead cores (8) to a radially external position with respect to said annular elements (9), while each flap (10) is interposed between said bead cores (8) and elements (9).

7. A method as claimed in claim 6, wherein a step is provided for pushing said annular elements (9) and the underlying semi-finished products in a radially external direction, while each bead core (8) is maintained stationary in a radial position.

8. A method as claimed in claim 6, wherein a step is provided for pushing said annular elements (9) and the underlying semi-finished products in a radially external direction, while each bead core (8) rubs on the corresponding flap (10) carrying out a compressing and consolidating action of the turned-up portion of said carcass ply (2) around said annular elements (9).
9. A method as claimed in claim 7 or 8, wherein said thrust step in a radially external direction goes on until said bead cores (8) and annular elements (9) substantially take the same radial position, each annular element (9) being maintained to an axially external position with respect to the corresponding bead core (8), each flap (10) being wrapped around said annular element (9) and keeping a position radially internal to said bead core (8).
10. A method as claimed in claim 4, wherein the step of turning up each flap (10) around the respective annular element (9) is mainly carried out by inflation of at least one inflatable bag (25).
11. A method as claimed in claim 4, wherein the step of turning up each flap (10) around the respective annular element (9) is mainly carried out by means of presser rollers.
12. A method as claimed in claim 1, wherein said annular element (9) has a cross-section of elongate shape tapering at one end.
13. A method as claimed in claim 1, wherein said annular element (9) is of elastomer material.

- 22 -

14. A first-stage drum for building a tyre for vehicle wheels, said tyre (1) comprising a carcass structure having at least one carcass ply (2) operatively associated with a pair of annular reinforcing structures suitable for matching with a mounting rim, each annular reinforcing structure comprising at least one bead core (8) and one annular element (9), said at least one carcass ply (2) being turned up at least on one of said annular elements (9); said first-stage drum (20) comprising at least: one central portion (32) operatively associated with two side portions (34), at least one transport device (24) for said bead cores (8), at least one pressure device adapted to consolidate the different semi-finished products with each other, at least one turning-up device (22) for said carcass ply (2) and a device (23) adapted to radially modify the surface of said drum (20), wherein said turning-up device (22) comprises at least one tubular separating element (26) open at least at one end, externally associated with said first-stage drum (20).

15. A drum as claimed in claim 14, wherein said pressure device comprises a presser roller (21) to consolidate adhesion between said carcass ply (2) and at least one semi-finished product disposed under it.

16. A drum as claimed in claim 14, wherein said turning-up device (22) is divided into two halves, each half being placed at an axially external position on opposite sides of said drum (20) and each half comprising said at least one tubular separating element (26).

17. A drum as claimed in claim 16, wherein each of said halves is axially movable and free to rotate about the axis of said drum (20).
- 5 18. A drum as claimed in claim 16, wherein each tubular element (26) is of the same diameter as, or of a lower diameter than said drum (20).
- 10 19. A drum as claimed in claim 16, wherein a plurality of circumferentially-disposed thread-like elements is provided around each tubular element (26).
- 15 20. A drum as claimed in claim 14, wherein a second pressure device is associated with said turning-up device (22).
- 20 21. A drum as claimed in claim 20, wherein said second pressure device comprises at least one inflatable bag (25), said inflatable bag (25) being expandable during operation of said drum (20) towards the drum surface.
- 25 22. A drum as claimed in claim 21, wherein said inflatable bag (25) is of annular shape, coaxial with said drum (20) and of bigger diameter.
23. A drum as claimed in claim 20, wherein said second pressure device comprises one or more presser rollers.
- 30 24. A drum as claimed in claim 14, wherein said tubular element (26) is made of an anti-adhesive elastic material.
-